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Religiosity and firms' credit access: empirical evidence from 16 developing countries

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Abstract

Access to credit remains a universal challenge for firms, particularly for small and medium sized enterprises (SMEs). While numerous studies have examined the determinants of credit access, focusing primarily on borrower characteristics, lender policies, and formal institutional factors such as laws and regulations, the role of informal institutional dynamics has often been overlooked. Among these, religiosity remains underexplored. This paper investigates the relationship between religiosity and firms' access to credit using cross sectional data from the 6th wave of the Business Environment and Enterprise Performance Survey (BEEPS VI) and the 7th wave of the World Values Survey (WVS7), covering a sample of firms across 16 countries. The findings reveal a positive relationship between religiosity and credit access, suggesting a potential causal link between the two.

JEL classification: G21, G41, Z12

Keywords: religiosity, religious adherence, firms' credit access

1. Introduction: Religiosity and credit access

Access to credit is widely recognized as a key factor contributing to the operations and growth of firms worldwide. Nonetheless, many businesses still consider insufficient access to finance a major obstacle, particularly when seeking loans from banks (OECD, 2014). To address this challenge, numerous studies have explored factors influencing firms' credit needs to offer insights into potential improvements. This literature mainly focuses on both the demand side determinants (i.e., borrowers' specific characteristics) and the supply side determinants (i.e., banks' characteristics) (Hewa Wellalage et al., 2020; Essel et al., 2019). However, firms and banks do not operate in isolation. Beyond firm specific and bank related factors, access to credit is also shaped by broader

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institutional environments (including cultural norms, societal values, and legal systems) that regulate financial transactions. These institutional forces influence the behavior and decisions of economic agents and serve as the "rules of the game" that structure economic activities, shape human behavior, and reduce uncertainties (North, 1990). Scholars typically distinguish between formal and informal institutional forces. Formal institutions encompass codified laws, regulations, and structured rules, while informal institutions include unwritten norms such as trust, social capital, moral principles, and cultural values. Although informal institutions are harder to measure (Gedajlovic et al., 2013), their influence on economic activities, particularly on credit access, merits close attention.

One particular informal factor, often overlooked in finance, is religiosity. We define religiosity as the reference to or practice of a religion, regardless of the specific tradition (Zhang et al., 2021; McDaniel and Burnett, 1990). This practice is underpinned by an individual's personal experience of finitude and the correlated reference to transcendental values. Faced with a transcendental experience, each believer expresses their faith through a particular form of revelation. Therefore, it should be clear that religiosity does not refer to a specific religion but rather to common factors present across all religions. Below, we detail the channels through which religiosity may impact access to credit, illustrated by the following framework:

Figure 1 : Channels through which religiosity can influence access to credit

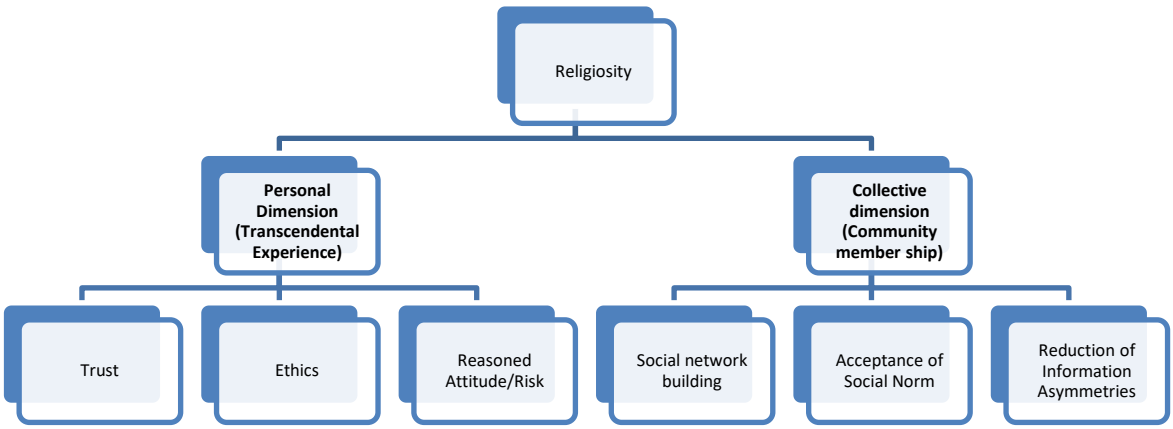


Figure 1 suggests the following interpretation. Individual religiosity, as experienced personally (Conroy and Emerson, 2004), arises from a transcendental

encounter leading individuals to face universal religious questions. One of these questions is anthropological, addressing the fundamental nature of individuals, their relationships with others, and their environment. Every individual, regardless of their specific spirituality, encounters the concept of otherness, whether relating to a divine being or another person. Such personal experiences foster trust, influencing all dimensions of one's personal and professional life particularly in matters of credit. It is essential to recall here that the words 'trust' and 'credit' share the same Latin root, 'credere,' meaning to trust or believe. Consequently, religiosity is expected to facilitate access to credit.

Moreover, believers from all religions share an inherent understanding of philosophical notions of good and evil. Crimes such as theft are universally condemned by religions as expressions of evil. These ethical convergences significantly impact economic behavior. Concerning credit, one can reasonably assume strategic defaults are less prevalent in highly religious regions, thereby facilitating credit access (Du, 2013; Yan and Yin, 2021).

Additionally, every religion confronts its followers with the experience of life's finitude and an encounter with a possible divine otherness. This experience implicitly compels respect for life, promoting a cautious approach to risk taking. Hence, in regions with higher religiosity, economic risks associated with credit funded projects are expected to be better managed, further facilitating credit access.

Turning to the collective dimension (Becker et al., 2021; Barro and McCleary, 2003), religiosity impacts access to credit through three distinct mechanisms (Jiang et al., 2015; Hilary and Hui, 2009; Adhikari and Agrawal, 2016). First, participation in a religious community implies adherence to social norms rooted in theological principles. Religions assert moral guidance across all life dimensions, forming the basis of moral theology. Over time, through scriptural exegesis, philosophical reflection, and contemporary adaptations, religions have developed social teachings emphasizing contractual compliance, especially financial agreements. This reduces moral hazard and strategic default risks (Dyreng et al., 2012).

The second channel involves social capital formation through participation in religious rituals and community gatherings. While the primary motivation for religious

community involvement is not explicitly social capital creation, an undeniable consequence is easier access to this capital, providing implicit guarantees for creditors.

Collectively, these factors contractual compliance incentives and social capital formation reduce the informational asymmetries inherent in credit relationships. It has long been recognized that adverse selection resulting from pre contractual information asymmetry significantly contributes to credit rationing (Stiglitz and Weiss, 1981).

Based on this preliminary framework, our model suggests religiosity is positively associated with easier credit access. To our knowledge, only Peruzzi (2024) addresses and confirms this hypothesis in the specific context of a single country Italy by examining only one type of business: family firms (Peruzzi, 2024). Thus, the aim of this study is to generalize this initial finding on the beneficial effects of religiosity on credit access, first by examining multiple countries (and thus populations with different religions), and second by considering all types of firms.

Our study is based on a sample of 4,040 firms from 16 countries, covering the period 2018–2020. The dataset is constructed by merging the World Values Survey (WVS7, 7th wave) and the Business Environment and Enterprise Survey (BEEPS, 6th wave). The extensive scope of these surveys conducted since 1981 for WVS, which includes more than 600 indicators, and since 1999 for BEEPS, which comprises approximately 200 indicators enables us to precisely assess key economic and institutional factors. Specifically, we measure firms' access to credit using data from the "K" section of the BEEPS survey on business finance and evaluate religious participation through the "Religious Values" section of the WVS survey, which captures the frequency of attendance at religious services. Thus, we measure religiosity at a geographic level.

Our findings corroborate and build on Peruzzi's (2024) conclusion by showing that, regardless of the religion in question, religiosity exerts a positive effect on firms' access to credit especially for those operating locally. To ensure the robustness of this causal link, we carried out a series of distinct tests (including instrumental variables, placebo tests, and a heterogeneity test), thereby compiling a convergent body of evidence in support of this causality.

The rest of the paper is structured as follows. Section 1 explains the data collection and methodology. The main findings of the paper are presented in Section 2,

while Section 3 focuses on robustness checks. Finally, Section 4 concludes the paper with discussion of several points.

2. Data and methodology

2.1. Data collection

With the objective of investigating the relationship between religiosity and firms' access to credit, we combine data from two sources: (1) the Business Environment and Enterprise Performance Survey, wave 6 (BEEPS VI), and (2) the World Values Survey, wave 7 (WVS7).

BEEPS VI was conducted by the EBRD, EIB, and WBG[1] between 2018 and 2020 across multiple regions, including Eastern Europe, Central Asia, North Africa, and the Middle East. It provides information on the quality of the business environment and covers 28,000 firms operating in various countries and industries. From BEEPS VI, we derive the dependent variable and control variables at the firm level.

In contrast, WVS7 focuses on individuals, collecting data from 66 countries and territories worldwide between 2017 and 2022. It offers valuable insights into social, political, economic, religious, and cultural aspects. From WVS7, we obtain data to measure religiosity and other informal institutional influences.

To merge the two datasets, we first calculate the mean of the religiosity variables for each region (based on ISO code) in each country using data from WVS7. We then merge these regions with those surveyed in BEEPS VI. In this way, a firm located in a region surveyed in BEEPS VI is matched with the average religiosity values of respondents living in the same region surveyed in WVS7. We apply the same method to other informal institutional variables. This process results in a database consisting of 14,307 firms from 16 countries.

However, when focusing only on firms with access to credit, the final dataset contains 4,040 observations from 16 countries (these countries are shown in **Table 3**). Notably, most countries in the database have a dominant religion that accounts for more than half of religious believers and followers. Firms operating in regions with higher levels of religiosity are more likely to be influenced by its impact. Given this

[1] EBRD: European Bank for Reconstruction and Development; EIB: European Investment Bank; WBG: World Bank Group.

consideration, we expect to observe meaningful results in explaining the relationship between regional religiosity and firms' access to credit.

2.2. Methodology

Aiming to examine the impact of religiosity on firms' credit access and based on the theoretical framework, we build the following model:

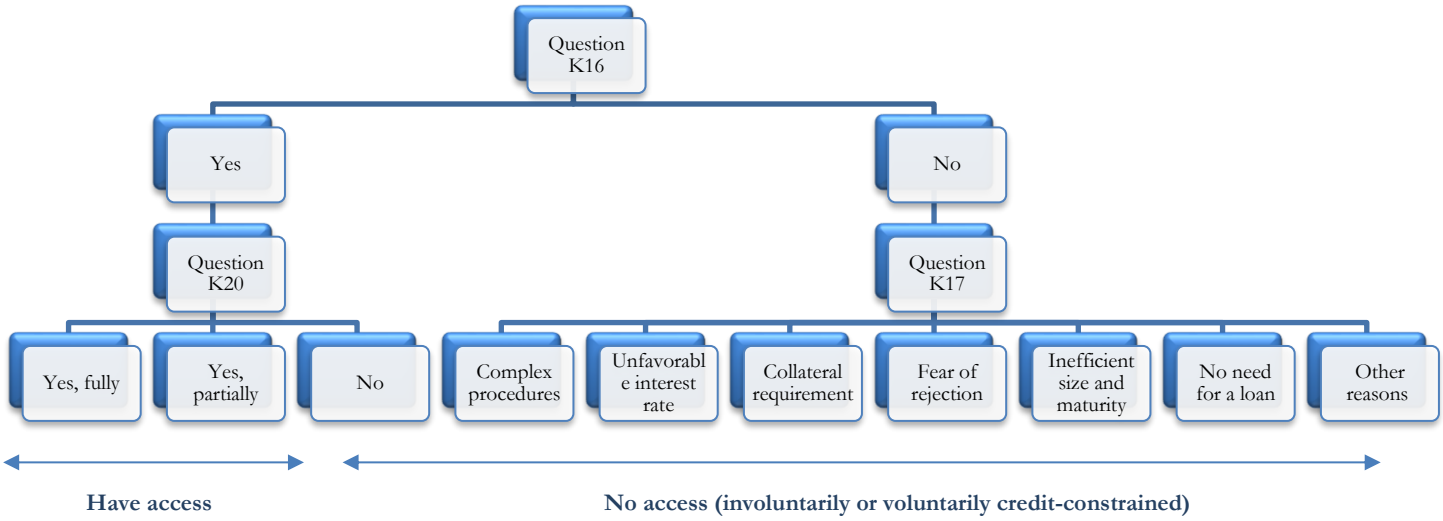
$$Credit\ access_i = \alpha_c + \beta_1 religiosity_i + \beta_2 firm\ characteristics_i + \beta_3 managerial_i + \beta_4 environmental_i + FE\ (country,\ sector,\ year) + \varepsilon \quad (1)$$

where the *credit access* of firm *i* is the dependent variable, *religiosity* represents the religiosity level of the region where that firm is located. *Firm characteristics* and *managerial* are included as a set of firm level control variables. The *environmental* factor is proxied by three variables: interpersonal trust, the economic development index, and the main market where firms operate. Additionally, we control for fixed effects by country, sector, and year to better protect the model from omitted variables specific to a particular country, year, or sector. Both OLS and Probit regressions are performed to check the robustness of the findings. Furthermore, the model clusters standard errors by country.

Based on the theoretical framework, a firm is considered to have credit access if its loan application is accepted. In contrast, a firm is classified as having no credit access if its application is rejected or if it is discouraged from applying. Using this framework, we define the dependent variable, *credit access*, based on responses to questions K16, K17, and K20 from BEEPS VI. First, firms were asked in question K16: *"Referring again to the last fiscal year, did this establishment apply for any lines of credit or loans?"* If the firm answered "Yes", we then consider question K20: *"Referring to this most recent application for a line of credit or loan, what was the outcome of the application?"* If the application was approved in full or in part, the firm is classified as having credit access. Otherwise, if the application was rejected, the firm is classified as involuntarily credit constrained, or having no credit access. In addition, firms that did not apply for a loan were asked in question K17: *"What was the main reason why this establishment did not apply for any line of credit or loan?"* If the firm did not apply due to complex application procedures, unfavorable interest rates, high collateral requirements, insufficient loan size or maturity, or a belief

that the application would not be approved, it is also classified as having no credit access, but as voluntarily credit constrained. Figure 2 illustrates this measurement.

Figure 2: Firm's credit access framework



We also employ stricter criteria for measuring credit access in the robustness analysis. Using the same approach mentioned above, but considering only loan applications that were fully accepted as having credit access, we define this variable as *access2*. Interestingly, BEEPS VI also provides questions regarding respondents' honesty in opinion and perception questions (A16), and the accuracy of responses to numerical questions (A17). Based on these questions, we create a smaller sample that includes only firms rated as providing truthful responses and having reliable numerical data. The dependent variable in this sample is named *access3*.

The main independent variable related to the impact of religiosity is *religiosity* defined based on question Q171 from WVS7, which measures the frequency of attending religious services at churches or other types of religious gathering places. This variable serves as a proxy for religiosity adherence. Responses are ranked from 1 to 7, representing "practically never" to "more than once a week". We compute the mean of responses for each region and merge this value with firm level data from BEEPS VI by region. For example, Greece has four regions, coded as 300001, 300002, 300008, and 300011. In region 300001 (Northern Greece), there are 150 respondents, and the religiosity variable is calculated as the mean of their responses.

In addition, we control for a set of variables related to (1) firm characteristics, (2) managerial characteristics, and (3) external environmental factors.

Regarding firm characteristics, we account for firm ownership *foreign, state,* and *private* based on the proportion of ownership held by foreign entities, the state, and domestic private entities, respectively. If a company is publicly listed, this can signal financial health and transparency. Therefore, we include the variable *traded* as a control. When applying for a loan, financial conditions play a crucial role. To capture this, we use *lnsales* (the natural logarithm of a firm's last sales) and *growth* (sales growth) as proxies for financial performance. Additionally, a firm's indebtedness status is considered, as firms with a strong financial record are more likely to secure loans. The dummy variable *debt*, which indicates whether a firm already has a credit line from banks or other financial institutions, is included. We also examine firm size, denoted as *size*, based on the number of permanent full time employees. Given the issue of asymmetric information in credit markets, we emphasize the importance of corporate transparency. To account for this, we include the dummy variable *audited*, which reflects the reliability of a firm's financial statements and information disclosure. Furthermore, we consider the dummy variable *innovation*, measured by whether a firm has successfully launched or developed new product lines. Finally, recognizing the significance of firms' perceptions of credit access, we include *finance_obstacle*, which captures their perception on levels of obstacles when obtaining loans.

In term of managerial characteristics, we control for the gender of the top manager (*female*) and the *experience* of firm managers, measured by their years of working experience in the sector.

Markedly, external environmental factors are controlled for through three elements: interpersonal trust, the economic development index, and the main market where firms operate. Based on the literature framework, trust could be a channel through which religiosity impacts credit access. Therefore, we address this issue by using Question 57 from WVS7, which assesses whether respondents believe that most people can be trusted. As with previous variables, we calculate the regional level mean before merging it with firm level data. Regional development may also influence the relationship between religion and access to credit. Unfortunately, GDP per capita is not available for every region across the 16 countries in our sample. Therefore, we

constructed a regional development index used here as a control variable from the WVS survey responses. This index is constructed on three components: occupational level, educational level, and perception of corruption, following the pioneering approach proposed by Sen (1988). Specifically, occupational level is aggregated from Questions 281, 282, and 283 in WVS7. Educational level is derived from Questions 275, 276, 277, and 278, while perception of corruption comes from Question 112. We then apply Principal Component Analysis (PCA) to these three components to derive the economic development index, referred as *dev_index*, in the main model. Additionally, we account for the main market where a firm sells its primary product whether international or domestic. This dummy variable, named *main_market*, is extracted from Question E1 in BEEP VI.

To address endogeneity issues, we utilize two instrumental variables, *confidence* and *homosexual*. *Confidence* measures the level of trust in churches, mosques, temples, or other religious institutions, while *homosexual* reflects attitudes toward homosexuality. Both variables are extracted from WVS7 and calculated at the regional level before being merged into the main database. Further clarification on the use of these variables is provided in the following sections.

Finally, we conduct various placebo tests, incorporating the variables *elec_obstacle*, *water_obstacle*, and *taxes_obstacle*, which capture firms' perceptions of electricity, water, and taxes as obstacles to their operations. All three variables are firm level dummies originating from BEEPS VI. The descriptions of variables are presented in the Appendices – Table 1.

3. Results

3.1. Univariate analysis

Table 2 presents a summary of the descriptive statistics for all variables used in the model. Out of 4,040 observations in the dataset, the number of firms with and without credit access is 1,325 and 2,715, accounting for 32.79% and 67.21% respectively.

Notably, *religiosity* (a proxy for regional religiosity impact) is higher in the group with credit access, which may support our hypothesis that there is a positive relationship between religiosity and firms' access to credit. Furthermore, for most variables, the mean values in the credit access group tend to be higher than those in the non access group.

Table 4 presents the correlation matrix between the main variables. Notably, the correlation between *religiosity* and *access1* is positive, consistent with our expectation that firms located in regions with higher levels of religiosity may have a higher probability of accessing credit. We also observe a relatively strong negative correlation between *religiosity* and the economic development index. This result is reasonable, and since both variables are essential to our models, we retain both in the regressions.

3.2. Multivariate analysis

The results in Table 5 show that the coefficient of the variable *religiosity* is positive and significant at the 1% and 5% levels. These findings are confirmed by both OLS and Probit regressions and are consistent with our main hypothesis that religiosity is positively associated with easier credit access. This aligns with the findings of Yan and Yin (2021), which confirm the constructive role of religiosity in household borrowing, as it can enhance the willingness to borrow, stimulate trust, and promote altruism in existing credit relationships. Notably, regardless of religion, the impact of religiosity can foster informal social networks and bonds, facilitating interactive relationships and smoothing business activities.

Apart from the main results, we also find that firms' characteristics play an important role in credit accessibility. Notably, the variable *finance_obstacle* has a significantly negative coefficient with the dependent variable at the 1% level, indicating

that a greater perception of difficulties in accessing credit tends to reduce the probability of obtaining credit.

Additionally, the coefficients of *lnsales, innovation, debt,* and *audited* are significantly positive at the 1% or 5% level, confirming that financial conditions, innovative experience, indebtedness history, and firms' transparency play important roles in the credit market. An increase in sales over time can serve as an indicator of a firm's efficiency and effectiveness, while innovative aspects may reflect a firm's commitment to improving operations.

Moreover, the presence of a credit line increases the likelihood of obtaining additional formal loans, as existing institutional loans can serve as a signal, helping firms pass the monitoring and screening stages of financial institutions. This, in turn, enhances their credibility as borrowers. Furthermore, having financial statements audited by external auditors makes firms more transparent to lenders. Information disclosure through auditor verification can reduce concerns related to asymmetric information problems, thereby increasing the likelihood of credit approval.

Notably, the results also confirm a positive coefficient for managers' experience. These findings align with existing literature on the determinants of credit access, as firms with more experienced managers tend to navigate the credit market more effectively due to their deeper understanding of financial regulations, market conditions, and lending procedures.

4. Robustness tests

We acknowledge that, even though previous findings indicate a highly significant link between religiosity and access to credit, establishing a causal relationship remains challenging. Indeed, as outlined in the introduction, religiosity is inherently difficult to quantify, making measurement errors a potential concern. Similarly, as with most empirical studies, we cannot eliminate the risk of omitted variable bias, which could influence the causal interpretation of our results. Finally, the possibility of reverse causality cannot be ruled out.

In an ideal setting, a natural experiment where regional religiosity varies in a truly random manner would provide a robust test of this relationship. However, in practice,

such a scenario is hardly conceivable, as religiosity is deeply shaped by historical and cultural factors.

In this section, we seek to assess the causal relationship between religiosity and access to credit by employing a set of complementary empirical methods, including instrumental variables, placebo tests and heterogeneity tests. Furthermore, in the final part of this section, we examine two alternative measures of access to credit to evaluate the robustness of our findings.

4.1. Instrumental variables

Here, we address the endogeneity issues raised in the introduction of this section by employing an instrumental variable (IV) approach with two instrumental variables.

The first is confidence in religion ("*confidence*"). This instrument is particularly relevant because it is strongly correlated with religiosity, as measured by frequency of attendance at religious services. A high level of trust in religious institutions generally reflects an individual's predisposition toward actively adhering to religious teachings, manifested concretely through regular participation in worship. Moreover, the exogeneity of this instrument is credible because trust in religion fundamentally stems from personal attributes shaped by factors such as education, early life socialization, or family and community culture. Consequently, trust in religion is unlikely to directly influence an individual's financial situation or creditworthiness. Instead, its effect on access to credit only operates indirectly, mediated by religious participation.

The second IV employed is acceptance of homosexuality ("*homosexual*"). This variable is also strongly correlated with religiosity since many religious traditions hold clear, generally conservative positions on this societal issue. Individuals with higher levels of religious involvement are typically more likely to express negative attitudes toward homosexuality, rendering this variable a reliable indicator of religious commitment. Furthermore, the exogeneity assumption here is plausible: attitudes toward homosexuality primarily reflect moral, cultural, or personal beliefs, and are not directly related to economic capability, financial solvency, or criteria explicitly considered by financial institutions in credit decisions. Therefore, acceptance or rejection of homosexuality should influence access to credit only indirectly through its

relationship with religious participation, thus meeting the exclusion restriction criterion required for IV validity.

Together, these two instruments satisfy the necessary criteria for IV estimation (2SLS). Therefore, we employ them to substitute for religious adherence (variable "*religiosity*"). The first stage regression and final regression findings are in Table 6. The results show both instrumental variables effectively address the endogeneity issue, and F statistics are strong enough to reject the hypothesis of weak instrumental variables.

The correlations between religiosity and the two instruments ("*confidence*" and "*homosexual*") are 0.41 and 0.54 respectively. The first stage regression results (Table 6) confirm that both instruments are highly significant (p value < 1%) in explaining the endogenous variable they replace. Furthermore, the F statistic is exceptionally large, exceeding 1000, which strongly supports the validity of the instrument combination. These results demonstrate that the instruments are not only relevant but also statistically robust.

The second stage regression results (Table 6) align with our main findings and further confirm the causal effect of religiosity on credit access: a higher level of religiosity facilitates access to credit. Additionally, to test for overidentification, we performed the Sargan and Basmann tests, which yielded Chi square values of 0.2488 and 0.2454, with p values of 0.6719 and 0.6204 respectively (Table 7). These results confirm the validity of the instrumental variables.

Finally, to further assess the robustness of our IV strategy, we conduct a bootstrap test with 871 replications (Table 8).[2] The bootstrap results confirm that the causal relationship between religiosity and credit access remains statistically significant, with a coefficient of 0.040 (standard error = 0.015) and a p value of 0.008, reinforcing our main findings. The 95% confidence interval [0.010; 0.069] suggests that the effect of religiosity on credit access remains consistently positive across resampled datasets. Despite minor fluctuations in some control variables, the bootstrap adjusted R^2 remains relatively stable (0.3989 vs. 0.451 in the initial estimation), confirming that the model

[2] This resampling technique helps evaluate the stability and reliability of the estimated coefficients by generating multiple simulated samples from the original dataset.

retains a solid explanatory power. These findings reinforce the robustness of our IV strategy, demonstrating that our instrumentation is not only valid but also stable across different resampling scenarios.

4.2. Placebo test on different scenarios

As a second strategy to confirm the causal interpretation of our findings on the link between religiosity and access to credit, we implement a series of placebo tests. The objective of these tests is to ensure that the observed relationship is not driven by omitted variables or spurious correlations. Specifically, we examine whether religiosity is associated with outcome variables theoretically unrelated to credit access. If our causal interpretation is valid, we should observe no statistically significant relationship between religiosity and these placebo outcomes.

To construct these placebo tests, we use three survey questions from the BEEPS VI database which assess firms' perceptions of obstacles to their operations:

1. *To what extent is electricity an obstacle to the current operations of this establishment?*
2. *To what extent is water an obstacle to the current operations of this establishment?*
3. *To what extent are tax rates an obstacle to the current operations of this establishment?*

For each of these questions, we define a binary variable equal to 1 if the firm reports the issue as a "major" or "severe" obstacle, and 0 otherwise.

Our econometric approach follows the same specification as in Equation (2), replacing the dependent variable "*credit access*" with each of the three placebo variables (variable "*obstacle*").

$$obstacle_i = \alpha_c + \beta_1 religiosity_i + \beta_2 firm\ characteristics_i + \beta_3 managerial_i + \beta_4 environmental_i + FE\ (country, sector, year) + \varepsilon \quad (2)$$

The results, presented in Table 9, confirm that the religiosity variable is not statistically significant for any of the placebo outcomes, reinforcing the credibility of our causal interpretation.

4.3. Heterogeneity test

In this third sub section, dedicated to enhancing the robustness of our causal hypothesis linking religiosity ("*religiosity*") to access to credit, we implement a heterogeneity analysis. This approach is grounded in the role of religiosity in fostering social capital, a mechanism that can plausibly explain its influence on firms' financing opportunities.

As discussed in the introduction, social capital formation is more effective when economic actors engage in frequent, localized interactions. In contrast, when such interactions are limited, the construction of social capital becomes more challenging. If our explanation regarding the causal link between religiosity and credit access holds, we expect the effect of religiosity on access to credit to be more pronounced for firms operating primarily within local markets, as they directly benefit from the trust and social cohesion established through religious participation. Conversely, for international firms which have fewer connections to the local economic fabric this effect should be significantly weaker or even non existent.

Empirically, we follow two strategies. First, we separate our sample into two parts. The first is made up of companies whose main market is national, and the second is made up of companies with an international vocation, and on these two sub samples we repeat the main Probit regression presented in Table 5. We then confirm the results obtained with these two sub samples by testing a regression (equation 3) on the full sample, incorporating an interaction term between the variable measuring religiosity and the type of company (domestic or international operations).

$$Credit\ access_i = \alpha_c + \beta_1 religiosity_i + \beta_2 main\_market_i +$$

$$\beta_3 religiosity_i \times main\_market_i + \beta_4 firm\ characteristics_i + \beta_5 managerial_i + \beta_6 environmental_i + FE\ (country, sector, year) + \varepsilon \quad (3)$$

The results for the two sub samples are also presented in Table 10. We note that the coefficient for the "*religiosity*" variable is 0.223 (significance at 1%) for companies

whose main markets are domestic, while the results are insignificant for companies with international operations. This result is confirmed by the one presented in Table 10, which incorporates the interaction variable. When the company's main market is domestic (*main_market*=0), the coefficient of religiosity is positive and significant, whereas when the company's main market is international (*main_market*=1), the coefficient of the interaction variable is no longer significant.

The results presented in this section show that the impact of religiosity on access to credit varies depending on firms' market orientation. While religiosity significantly influences credit access for domestically focused firms, it does not exhibit a significant effect for internationally active firms. We believe that this conclusion strengthens the credibility of our findings regarding the role of religiosity in shaping credit access.

4.4. Different measurement for credit access

In this final sub section dedicated to robustness tests, we assess whether our findings are sensitive to different measurements of the variable "*credit access*" by testing two alternative definitions. First, we adopt a stricter measure of access to credit, which considers only cases where firms receive the full amount of the loan requested. This new dependent variable is denoted as *access2*. Second, leveraging the richness of the BEEPS IV survey, we incorporate an additional credibility check based on interviewer assessments of response reliability. Specifically, we use questions A16 and A17 from the *"Post Interview Information"* section, which indicate whether the interviewer considered the firm's responses credible or based on valid estimates/calculations. We define *access3* as a binary variable equal to 1 if the firm obtained the full loan amount requested and if its responses were deemed credible or relevant by the interviewer.

The results are summarized in Table 11. Columns (1) and (2) present the OLS and Probit regression results using *access2* as the dependent variable, while Columns (3) and (4) report OLS and Probit regression results using *access3*. We observe a statistically significant positive coefficient between religiosity and access to credit, as measured by both *access2* and *access3*. The coefficients maintain the same level of significance and are similar or even higher compared to our main specification. These results reinforce the robustness of our findings, demonstrating that the relationship between religiosity and

access to credit is not driven by a specific definition of credit access but rather reflects a broader, consistent pattern.

5. Conclusion

Using two cross sectional databases, BEEPS VI and WVS7, covering the period 2017–2022 and spanning 16 countries, we investigate the relationship between religiosity and firms' access to credit. Our findings extend those of Peruzzi (2024) on Italian family businesses, demonstrating that, irrespective of specific religious affiliations, higher religiosity enhances access to credit. These results highlight the crucial role of informal institutions in shaping business activities, in line with North (1990a). To ensure the causal nature of this relationship, we employ a comprehensive set of empirical strategies, including instrumental variable estimation, placebo tests, and heterogeneity tests. The convergence of these methodological approaches strengthens the evidence supporting a robust causal link between religiosity and firms' credit access.

The above results have important implications at different levels.

At the bank level, these results suggest that in large countries, the optimal model for bank credit distribution depends on informal institutional factors such as religiosity. Stronger religiosity implies a reduction in market imperfections: corporate ethics are more assertive, limiting moral hazard problems and the risk of strategic default; shared religious practices are fertile ground for the creation of shared social capital, which acts as an implicit guarantor and reduces anti selection phenomena. As a result, to maximize credit distribution, a bank should favor a more relational model (Berger et al., 2005) in areas with low religiosity; such a model facilitates the feedback of information from the firm to the bank, offsetting the risks of credit rationing.

At the firm level, companies with predominantly domestic activities need to be aware that access to credit also depends on informal external factors, such as religiosity, which they do not control. The less assertive religiosity is in a given geographical area, the greater the need for firms to play an active role in transmitting credible information to their bank, in order to offset the suspicions and information imperfections that a secularized environment may induce in their bank.

In terms of public policy and the structuring of financial systems, it is already well known that, when market imperfections are significant, financial intermediaries

outperform financial markets when it comes to transmitting savings from households to businesses. Our results suggest that these market imperfections are all the stronger when religiosity is low. This should encourage national and supranational policymakers to consider informal institutions, such as religiosity, as an important contextual element in determining the optimal structure of financial systems.

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Appendices

Table 1: Variables summary

Table 1 summarises the variables with detailed descriptions and measurements and the sources used to collect these variables.

Variable	Details	Source
	Dependent variable	
access1	=1 when firm applied for loans accepted either partially or fully =0 when firms do not apply or apply but are rejected	BEEPS VI
access2	=1 when firm applied for loans accepted in full =0 when firms do not apply or apply but are rejected	BEEPS VI
access3	=1 when firm applied for loans accepted in full (only truthful answers and statistics taken directly from the establishments or based/computed on reliable estimates) =0 when firms do not apply or apply but are rejected	BEEPS VI
	Independent variables	
religiosity	Level of adherence to religious services: 7: More than once a week > 1: Never	WVS 7th
	Instrumental variables	
confidence	Level of confidence in church/mosque/temple etc.: 4: A great deal >1: None at all	WVS 7th
homosexual	Level of justification of homosexuality: 1: Never justifiable >10: Always justifiable	WVS 7th
	Control variables	
	Firms' specific characteristics	
foreign	Firms more than 50% foreign owned	BEEPS VI
state	Firms more than 50% State owned	BEEPS VI
private	Firms more than 50% privately owned	BEEPS VI
traded	=1 if firm trades on the stock market, =0 otherwise	BEEPS VI
lnsales	= ln of total sales	BEEPS VI

debt	=1 if firms already have credit line(s), =0 otherwise	BEEPS VI
growth	= 1 if firm experiences growth in sales, =0 otherwise	BEEPS VI
firmsize	= 0 if number of permanent employees less than 100, =1 if 100 upwards	BEEPS VI
finance_obstacle	Firm's perception of difficulty in accessing finance	BEEPS VI
audited	=1 if firm is audited, =0 otherwise	BEEPS VI
innovation	=1 if firm has new products and services, =0 otherwise	BEEPS VI
External environment characteristics		
main_market	=1 if firm's main market is international, =0 for domestic market	BEEPS VI
dev_index	Economic development index at regional level	WVS 7th
trust_people	=1 if most people can be trusted, =0 otherwise	WVS 7th
Firms' managerial characteristics		
female	=1 if the top manager is female, =0 otherwise	BEEPS VI
experience	= number of years of managers' experience	BEEPS VI
Other variables for placebo test		
elec_obstacle	=1 if firms consider electricity as an obstacle to business operations, =0 otherwise	BEEPS VI
water_obstacle	=1 if firms consider water as an obstacle to business operations, =0 otherwise	BEEPS VI
taxes_obstacle	=1 if firms consider taxes as an obstacle to business operations, =0 otherwise	BEEPS VI

Table 2 : Descriptive statistics of variables summaries the descriptive statistics of our variables. The variables are defined in Table 1.

*The column "t test" shows the significance of a two sample t test of difference in means of variables between firms that have access to bank credit and those that do not. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels respectively.*

	Whole sample					No access		Have access		t test
Variable	Obs	Mean	Std.Dev.	Min	Max	Mean	Std.Dev.	Mean	Std.Dev.	
access1	4040	.328	.47	0	1					
religiosity	4040	3.002	.901	.771	4.482	2.93	.845	3.03	.926	
dev_index	4040	.242	1.273	1.839	2.895	.176	1.31	.377	1.181	***
trust_people	4040	.004	.063	0	1	.003	.054	.006	.077	**
main_market	4040	.082	.275	0	1	.059	.236	.131	.337	***
female	4040	.263	.44	0	1	.25	.433	.29	.454	**
experience	4040	20.427	11.173	1	70	19.629	10.885	22.063	11.573	***
lnsales	4040	16.788	2.681	9.393	28.506	16.299	2.526	17.789	2.713	***
foreign	4040	.036	.187	0	1	.035	.183	.04	.196	***
state	4040	.001	.027	0	1	0	.019	.002	.039	**
private	4040	.927	.26	0	1	.919	.272	.943	.231	
growth	4040	.525	.499	0	1	.519	.5	.535	.499	***
innovation	4040	.194	.395	0	1	.137	.344	.311	.463	***
audited	4040	.458	.498	0	1	.413	.492	.551	.498	***
debt	4040	.446	.497	0	1	.235	.424	.877	.329	***
traded	4040	.057	.232	0	1	.055	.229	.06	.238	*
finance obstacle	4040	1.997	1.194	0	4	2.055	1.156	1.879	1.262	***
size	4040	.199	.399	0	1	.157	.364	.283	.451	***

Table 3: List of countries in the sample

	Country	Continent
1	Armenia	Asia
2	Egypt	Africa
3	Greece	Europe
4	Jordan	Asia
5	Kazakhstan	Asia
6	Lebanon	Asia
7	Mongolia	Asia
8	Morocco	Africa
9	Romania	Europe
10	Russia	Europe
11	Serbia	Europe
12	Tajikistan	Asia
13	Tunisia	Africa
14	Turkey	Europe
15	Ukraine	Europe
16	Kyrgyzstan	Asia

Table 4*:* Correlation matrix between main variables

This table illustrates the correlation matrix between the main variables. All variable descriptions are shown in Table 1.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) access1	1.000												
(2) religiosity	0.047	1.000											
(3) dev_index	0.070	-0.692	1.000										
(4) trust_people	0.023	0.026	0.076	1.000									
(5) female	0.044	-0.142	0.154	0.015	1.000								
(6) experience	0.104	0.248	-0.263	-0.011	-0.017	1.000							
(7) lnsales	0.257	-0.368	0.443	0.043	0.011	0.018	1.000						
(8) foreign	0.018	0.027	-0.014	-0.012	-0.031	-0.045	0.058	1.000					
(9) growth	0.013	-0.030	0.011	0.020	0.060	-0.066	0.034	0.021	1.000				
(10) innovation	0.209	-0.166	0.240	-0.021	0.133	-0.006	0.218	0.054	0.129	1.000			
(11) audited	0.130	0.172	-0.192	-0.010	-0.063	0.137	0.158	-0.003	0.062	0.017	1.000		
(12) debt	0.609	-0.110	0.117	0.054	0.081	0.038	0.216	0.020	0.024	0.196	0.070	1.000	
(13) firmsize	0.151	-0.014	0.030	-0.021	0.033	0.096	0.364	0.131	0.042	0.070	0.069	0.156	1.000

Table 5: Main regression results

*This table presents the results of regressions examining the effect of religiosity on firms' credit access using OLS in column (1) and Probit in column (2). Definitions of the variables are provided in Table 1. Robust standard errors in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% and 1% levels respectively.*

	Dependent variable = access1	
	(1)	(2)
religiosity	.034** (.014)	.187*** (.056)
dev_index	.047 (.033)	.247 (.156)
trust_people	.001 (.065)	.153 (.191)
main_market	.045 (.034)	.156 (.134)
female	.008 (.01)	.027 (.048)
experience	.002** (.001)	.006** (.003)
lnsales	.02*** (.006)	.089*** (.025)
foreign	.015 (.054)	.202 (.24)
state	.162 (.279)	.532 (.775)
private	.011 (.033)	.17 (.186)
growth	.007 (.02)	.012 (.092)
innovation	.072** (.036)	.301*** (.113)
audited	.064*** (.021)	.304*** (.078)
debt	.514*** (.063)	1.817*** (.168)
traded	.042 (.029)	.188* (.113)
finance_obstacle	.033*** (.008)	.158*** (.035)
firmsize	.002 (.028)	.027 (.1)
Constant	.171 (.122)	3.05*** (.494)

Country FE	YES	YES
Sector FE	YES	YES
Year FE	YES	YES
Cluster country	YES	YES
Method	OLS	Probit
R2	0.456	-
Pseudo R2	-	0.417
N	4040	4040

Table 6: Instrumental variables 2SLS regression: Final results

*This table presents the instrumental variable (IV) results. Columns (1) and (2) report the second and first stages to find the effect of religiosity on firms' credit access using confidence and homosexual as IVs. Control variables include lnsales, foreign, state, private, growth, innovation, audited, debt, traded, finance obstacle, size, female, experience, dev_index, trust_people, and market. Definitions of the variables are provided in Table 1. Robust standard errors in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% and 1% levels respectively.*

	Dependent variable	
	access1	**religiosity**
	Second stage (1)	**First stage (2)**
religiosity	.061*** (.021)	
confidence		1.359*** (.025)
homosexual		.208*** (.014)
F test		1437.53
Control	YES	YES
Country FE	YES	YES
Sector FE	YES	YES
Year FE	YES	YES
Cluster country	NO	NO
R2	0.451	0.8459
N	3319	3319

Table 7: Overidentification test for Instrumental variables 2SLS regression

This table shows the results of an overidentification test after using instrumental variables 2SLS regression using confidence and homosexual as IVs.

	Score	**p-value**
Sargan (score) chi2(1)	.248798	0.6179
Basmann chi2(1)	.245368	0.6204

Table 8: Bootstrap test for Instrumental variables 2SLS regression

*This table presents the bootstrap test results on instrumental variable (IV) regression. The coefficient is shown in the first row, followed by robust clustered standard errors in parentheses, represented in Column (1). Column (2) reports the confidence intervals with 95% certainty. Control variables include lnsales, foreign, state, private, growth, innovation, audited, debt, traded, finance obstacle, size, female, experience, dev_index, trust_people, and market. Definitions of the variables are provided in Table 1. Robust standard errors in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% and 1% levels respectively.*

Observed	**Bootstrap**	**Normal_based**	
access1		[95% conf. interval]	
	(1)	(2)	
religiosity	0.040** (0.015)	0.010	0.069
Control	YES		
Replication	871		
R squared	0.3989		
Cluster country	NO		
N	3,319		

Table 9: Placebo test results for different scenarios

*This table presents placebo tests for different scenarios in which religiosity is associated with outcome variables theoretically unrelated to credit access. Columns (1), (2), and (3) represent the results for three types of obstacles that firms can perceive: taxes, water and electricity connection. Control variables include lnsales, foreign, state, private, growth, innovation, audited, debt, traded, finance obstacle, size, female, experience, dev_index, trust_people, and market. Definitions of the variables are provided in Table 1. Robust standard errors in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% and 1% levels respectively.*

	Dependent variable		
	taxes_obstacle (1)	water_obstacle (2)	elec_obstacle (3)
religiosity	.177 (.15)	.113 (.101)	.106 (.138)
Control	YES	YES	YES
Country FE	YES	YES	YES
Sector FE	YES	YES	YES
Year FE	YES	YES	YES
Cluster country	YES	YES	YES
Method	Probit	Probit	Probit
Pseudo R2	0.073	0.088	0.081
N	3953	1975	4037

Table 10: Regression for firms operating in different main markets

*This table presents the results of regressions examining the effect of religiosity on firms' credit access while accounting for the firms' main market. Column (1) reports the effect on firms selling their primary products domestically. Column (2) presents the results for firms operating in the international market, and Column (3) examines the interaction between religiosity and market. Control variables include lnsales, foreign, state, private, growth, innovation, audited, debt, traded, finance_obstacle, size, female, experience, dev_index, and trust_people. Definitions of these variables are provided in Table 1. Robust standard errors are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% and 1% levels respectively.*

	Dependent variable = access1		
	Domestic market (1)	International market (2)	religiosity*market (3)
religiosity	.223*** (.051)	.54 (.345)	.039** (.014)
market			.208* (.105)
market * religiosity			.053 (.039)
Control	YES	YES	YES
Country FE	YES	YES	YES
Sector FE	YES	YES	YES
Year FE	YES	YES	YES
Cluster country	YES	YES	YES
Method	Probit	Probit	OLS
Pseudo R2	0.416	0.496	
R2			0.456
N	3707	313	4040

Table 11: Different measurements for credit access

*This table presents the results of regressions examining the effect of religiosity on firms' credit access using different measures of credit access. Columns (1) and (2) show the results where the dependent variable is access2, estimated using OLS and Probit methodologies respectively. Columns (3) and (4) present the results where the dependent variable is access3, also estimated using OLS and Probit methodologies respectively. Control variables include lnsales, foreign, state, private, growth, innovation, audited, debt, traded, finance obstacle, size, female, experience, dev_index, trust_people, and market. Definitions of the variables are provided in Table 1. Robust standard errors in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% and 1% levels respectively.*

	Dependent variables			
	access 2 (1)	access 2 (2)	access3 (3)	access 3 (4)
religiosity	.031** (.013)	.194*** (.051)	.036*** (.01)	.235*** (.049)
Control	YES	YES	YES	YES
Country FE	YES	YES	YES	YES
Sector FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Cluster country	YES	YES	YES	YES
Method	OLS	Probit	OLS	Probit
R2	0.468		0.462	
Pseudo R2		0.441		0.450
N	3,949	3,949	3,790	3,790